

# HP 8762/3/4 A, B, C Multiport Coaxial Switches

dc - 4 GHz, dc - 18 GHz, dc - 26.5 GHz

## Technical Data

**High performance switches for microwave and RF instrumentation and systems**

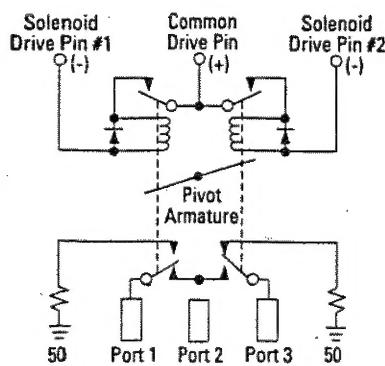
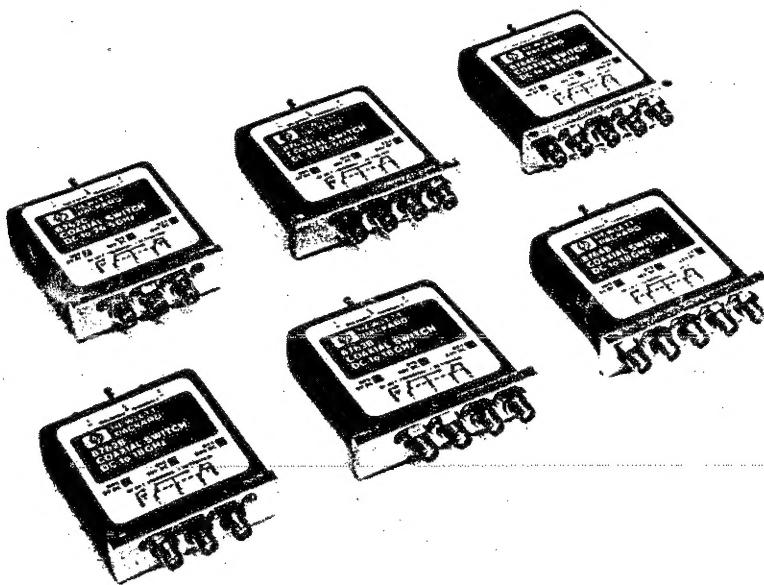


Figure 1. HP 8762

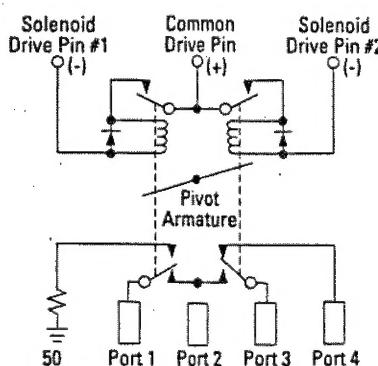


Figure 2. HP 8763

Hewlett-Packard now offers a versatile line of multiport 50Ω mechanical latching coaxial switches with the performance and reliability that you have come to expect in HP microwave accessories.

Offering you excellent electrical and mechanical performance with broadband operation, high isolation, low SWR, long life and exceptional repeatability, these switches are designed with your applications in mind. Frequency ranges are available to 4 GHz and 18 GHz for the A and B models with SMA connectors and to 26.5 GHz for the C models with APC-3.5 connectors.

The HP 8762A, HP 8762B and HP 8762C (Figure 1) are single-pole double-throw switches with high isolation, >100 dB at 4 GHz for the A model, >90 dB at 18 GHz for the B model and >50 dB at 26.5 GHz for the C model. Both models terminate the unused port into 50Ω, a key feature for your applications where low SWR is required on all ports.

The HP 8763A, HP 8763B and HP 8763C (Figure 2) have 4 RF ports with one internal 50Ω termination. Designed specifically for your applications requiring a transfer switch or a cross switching element in a microwave switching assembly.

**When your Microwave Switching applications require the very best, look to Hewlett-Packard**

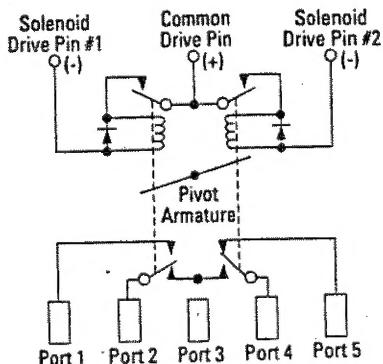


Figure 3. HP 8764

The HP 8764A, HP 8764B and HP 8764C (Figure 3) round out the family with 5 RF ports, giving you flexibility to configure the switch for your specific needs.

**Designed to meet your most demanding applications**

**Multisource Switching**

The HP 8762A, HP 8762B or C is an excellent choice for applications where you require selection of multiple signal sources, frequency counters, or signal control devices such as modulators or filters, or routing signals to multiple test ports as shown in Figure 4.

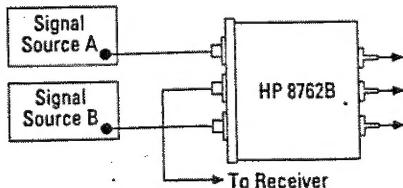


Figure 4. Multi-source switching.

**Transfer Switching**

For applications requiring a "transfer switch," as shown in Figure 5, an HP 8763A,B or C is the ideal choice to insert a component, such as a filter or mixer, into a signal path. Another popular use is to switch between a device under test and a through path for system calibration. The HP 8763A,B and C's internal load can terminate the device under test when in the through mode (up to 1 watt). When an HP 8763A,B or C is used in this configuration, the fifth port can be terminated externally with a high power termination.

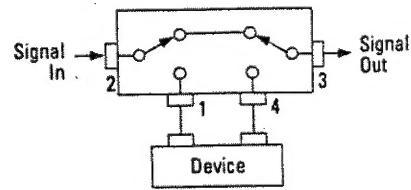


Figure 5. HP 8763 used as a transfer switch (equivalent circuit action).

**Computer-aided Test Systems**

In automatic test systems, any of the switches can be driven directly by the HP 11713A Attenuator/Switch driver, so the switch becomes HP-IB programmable. Each HP 11713A can drive up to ten HP 876x series switches.

### Reverse Signal Path

Figure 6 shows how an HP 8764 and HP 8762 may be used to provide a "transceiver" configuration. This example illustrates how one amplifier can be used to transmit or receive. Any application where the signal path direction needs to be reversed could use this configuration.

### Portable and Remote Applications

Due to their small package size, light weight, lower power consumption, and high reliability, these switches are ideal for designing into your portable or remote applications. The light weight and repeatability make them well suited for portable spectrum analyzers and other portable microwave test equipment. Their 1,000,000 cycle life make them the ideal candidate for designing into systems, such as communications repeaters or remote monitoring stations that demand low service. The switch's automatic coil disconnect feature and low current drain during switching minimize the amount of power needed for operating the switches.

### Help for your Special Needs

For more information on the applications of Hewlett-Packard Switches, request Application Note 332, "Microwave Switching from SPDT to Full-Access Matrix," literature number 5953-6466, or contact HP for your special switching needs.

AN 332-1, "Novel Combinations of Microwave Switches and Step Attenuators for Programming Applications," expands on some novel product capabilities.

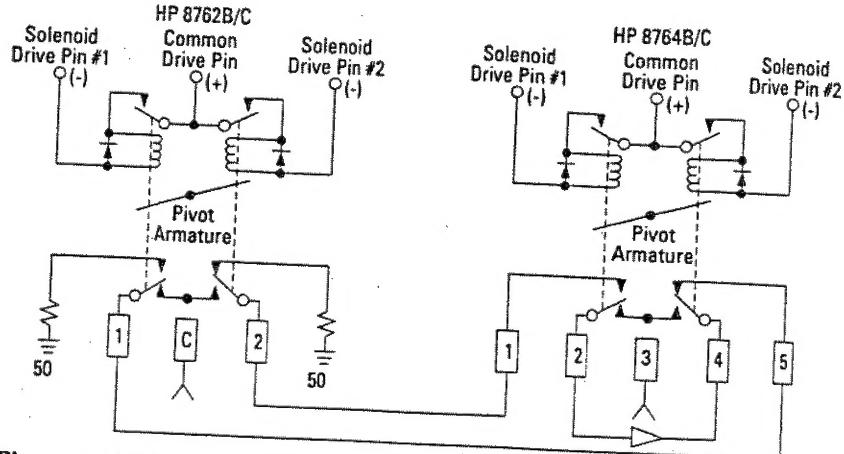
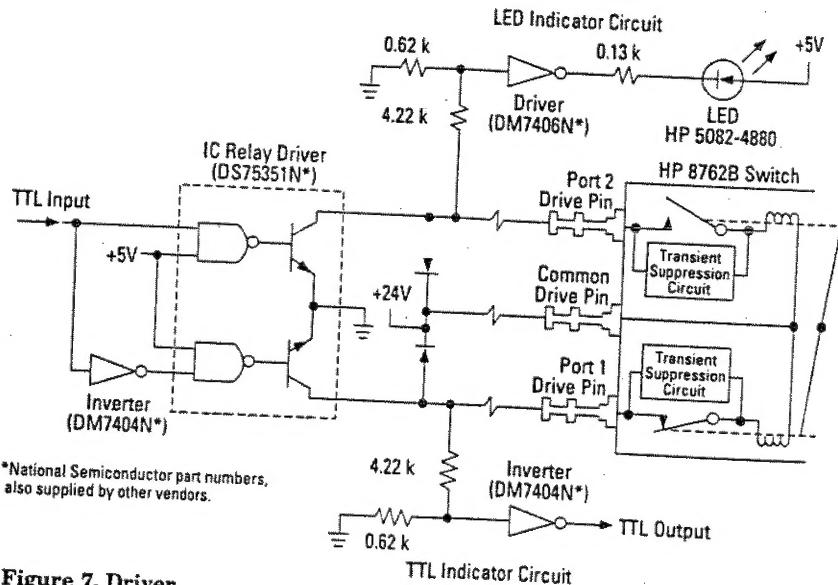


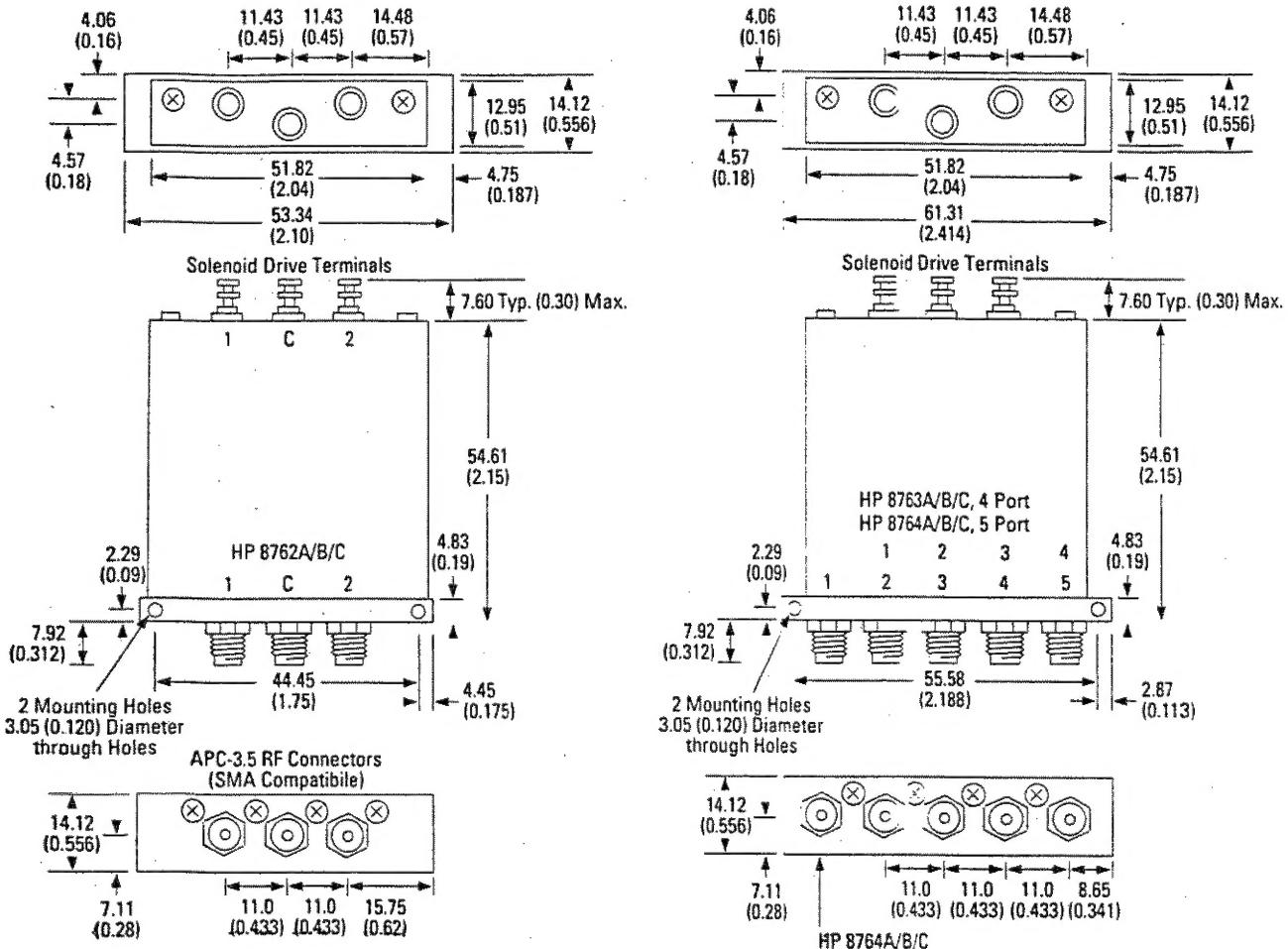
Figure 6. Signal reversal.



\*National Semiconductor part numbers, also supplied by other vendors.

Figure 7. Driver circuit with remote indicator circuits

**Dimensions in millimeters  
and (inches)**



# **Technical Data Sheet Supplement**



**HP Part No. 5951-5993  
Printed in USA January 1995**

**Edition 2**

## Specifications



HP Model Numbers	HP 8762A HP 8763A HP 8764A	HP 8762B HP 8763B HP 8764B	HP 8762C HP 8763C HP 8764C
Frequency Range	dc - 4 GHz	dc - 18 GHz	dc - 26.5 GHz
Insertion Loss	<0.20 dB, dc - 2 GHz <0.25 dB, 2 - 4 GHz	<0.20 dB, dc - 2 GHz <0.50 dB, 2 - 18 GHz	<0.25 dB, dc - 2 GHz <0.50 dB, 2 - 18 GHz <1.25 dB, 18 - 26.5 GHz
Isolation Between Ports	>100 dB, dc - 4 GHz	>90 dB, dc - 18 GHz	>90 dB, dc - 18 GHz >50 dB, 18 - 26.5 GHz
SWR Through Line	<1.10, dc - 2 GHz <1.20, 2 - 4 GHz	<1.10, dc - 2 GHz <1.20, 2 - 12.4 GHz <1.30, 12.4 - 18 GHz	<1.15, dc - 2 GHz <1.25, 2 - 12.4 GHz <1.40, 12.4 - 18 GHz <1.80, 18 - 26.5 GHz
Into Internal 50Ω Load (HP 8762s and HP 8763s)	<1.10, dc - 2 GHz <1.20, 2 - 4 GHz	<1.15, dc - 2 GHz <1.20, 2 - 12.4 GHz <1.30, 12.4 - 18 GHz	<1.15, dc - 2 GHz <1.25, 2 - 12.4 GHz <1.40, 12.4 - 18 GHz <1.80, 18 - 26.5 GHz
Connectors	SMA (f)	SMA (f)	3.5 mm (f)
Insertion Loss			
Repeatability			
dc - 18 GHz	<0.03 dB	<0.03 dB	<0.03 dB
18 - 26.5 GHz			<0.5 dB
(Typical up to 1,000,000 cycles)			
General Operating Data			
Maximum Power Rating	1 watt average; 100 watts peak; +7 Vdc		
Life (Typical)	>1,000,000 Cycles		
Switching Solenoid	Switching speed 30 mS maximum		
Solenoid Electrical Specifications and Switching Voltage Options			
Option	Voltage	Current	Impedance
Standard	24 Vdc (20 - 30 Vdc)	120 mA @ 24 Vdc	200Ω, 127 mH
011	5 Vdc (4.5 - 7 Vdc)	400 mA @ 5 Vdc	13Ω, 8 mH
015	15 Vdc (12 - 20 Vdc)	182 mA @ 15 Vdc	82Ω, 57 mH

### Environmental

Operating Temperature	Humidity 95% RH, 40°C, 5 days	Vibration 0.05", 10 to 55 Hz	Shock 50 g's, 3 mS
-25 to +75°C			

For more information, call your local HP sales office listed in the telephone directory white pages. Ask for the Test and Measurement Department, or write to Hewlett-Packard:

#### United States

Hewlett-Packard Company  
5201 Tollview Drive  
Rolling Meadows, IL 60008

Hewlett-Packard Company  
5161 Lankershim Blvd.  
No. Hollywood, CA 91601

Hewlett-Packard Company  
2015 South Park Place  
Atlanta, GA 30339

Hewlett-Packard Company  
4 Choke Cherry Road  
Rockville, MD 20850

#### Canada

Hewlett-Packard Ltd.  
6877 Goreway Drive  
Mississauga, Ontario L4V1M8

#### Far East

Hewlett-Packard Asia Ltd.  
22/F Bond Centre  
West Tower  
89 Queensway  
Central, Hong Kong

#### Japan

Yokogawa-Hewlett-Packard Ltd.  
15-7, Nishi Shinjuku 4-chome  
Shinjuku-ku  
Tokyo 160, Japan

Data Subject to Change  
February 1990

Printed in U.S.A.  
5952-1873  
0400

## CERTIFICATION

*Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST, formerly NBS), to the extent allowed by the institute's calibration facility, and to the calibration facilities of other International Standards Organization members.*

## WARRANTY

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period of one year from date of delivery. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

## LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

**NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

## EXCLUSIVE REMEDIES

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. HP SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

## ASSISTANCE

*Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard Products.*

*For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Addresses are provided at the back of this manual.*

## **General Information**

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This information sheet supplements the instruments Technical Data Sheet. The data sheet describes the instrument, its specifications, options, and accessories. The instrument is certified and warranted as indicated in this document. For further information contact the nearest Hewlett-Packard Sales and Service offices (see Sales and Service section).

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### **Initial Inspection**

Inspect the shipping container for damage. If the shipping container or packing material is damaged it should be kept until the contents of the shipment have been checked mechanically and electrically. If there is mechanical damage or if the instrument does not meet its specifications, notify the nearest Hewlett-Packard office. Keep the damaged shipping materials (if any) for the carrier and a Hewlett-Packard representative to inspect.

### **Packaging**

The following general instructions should be used for re-packaging with commercially available materials:

- a. Wrap the instrument in heavy paper or plastic. If shipping to a Hewlett-Packard office or service center, attach a tag indicating the type of service required, return address, model number, and full serial number.
- b. Use a strong shipping container. A single-wall corrugated carton made of 200 pound-per-square-inch test material is adequate.
- c. Use enough shock-absorbing material around all sides of the instrument to provide firm cushion and prevent movement inside the container.
- d. Seal the shipping container securely.
- e. Mark the shipping container FRAGILE to assure careful handling.

### **Environment**

#### **Non-Operating**

The instrument should be stored in a clean, dry environment. The following environmental limitations apply to both storage and shipment (unless otherwise stated in the data sheet):

- Temperature, -55 to +75°C
- Humidity, less than 95% relative at +40°C
- Altitude, less than 15,300 metres (50,000 feet)

## **Operating**

The operating environment of the instrument should be within the following limitations (unless otherwise stated in the data sheet):

- Temperature, 0 to +55°C
- Humidity, less than 95% relative at +40°C
- Altitude, less than 4,600 metres (15,000 feet)

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**Note** Storage or operation of the instrument within an environment other than that which is specified may cause damage to the instrument and may void the warranty.

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## **Adjustments**

No adjustments should be attempted.

## **Repair**

If the instrument fails to operate within the specifications listed in the data sheet, it should be returned to Hewlett-Packard for repair.

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**Note** Attempting to service or repair the instrument may void the warranty.

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**Hewlett-Packard Sales and Service Offices**

**IN THE UNITED STATES**

**California**

Hewlett-Packard Co.

1421 South Manhattan Ave.

P.O. Box 4230

Fullerton, CA 92631

(714) 999-6700

Hewlett-Packard Co.

301 E. Evelyn

Mountain View, CA 94039

(415) 694-2000

**Colorado**

Hewlett-Packard Co.

24 Inverness Place, East

Englewood, CO 80112

(303) 649-5000

**Georgia**

Hewlett-Packard Co.

2000 South Park Place

P.O. Box 105005

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(404) 955-1500

**Illinois**

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(312) 255-9800

**New Jersey**

Hewlett-Packard Co.

120 W. Century Road

Paramus, NJ 07653

(201) 265-5000

**Texas**

Hewlett-Packard Co.

930 E. Campbell Rd.

Richardson, TX 75081

(214) 231-6101

**IN AUSTRALIA**

Hewlett-Packard Australia Ltd.

31-41 Joseph Street

Blackburn, Victoria 3130

895-2895

**IN CANADA**

Hewlett-Packard (Canada) Ltd.

17500 South Service Road

Trans-Canada Highway

Kirkland, Quebec H9J 2X8

(514) 697-4232

**IN FRANCE**

Hewlett-Packard France

F-91947 Les Ulis Cedex

Orsay

(6) 907-78-25

**IN GERMAN FEDERAL REPUBLIC**

Hewlett-Packard GmbH

Vertriebszentrale Frankfurt

Berner Strasse 117

Postfach 560 140

D-6000 Frankfurt 56

(0611) 50-04-1

**IN GREAT BRITAIN**

Hewlett-Packard Ltd.

King Street Lane

Winnersh, Wokingham

Berkshire RG11 5AR

0734 784774

**IN OTHER EUROPEAN COUNTRIES**

Hewlett-Packard (Schweiz) AG

Allmend 2

CH-8967 Widen (Zurich)

(0041) 57 31 21 11

**IN JAPAN**

Yokogawa-Hewlett-Packard Ltd.

29-21 Takaido-Higashi, 3 Chome

Suginami-ku Tokyo 168

(03) 331-6111

**IN PEOPLE'S REPUBLIC OF CHINA**

China Hewlett-Packard, Ltd.

P.O. Box 9610, Beijing

4th Floor, 2nd Watch Factory Main Bldg.

Shuang Yu Shu, Bei San Huan Rd.

Beijing, PRC

256-6888

**IN SINGAPORE**

Hewlett-Packard Singapore

Pte. Ltd.

1150 Depot Road

Singapore 0410

273 7388

Telex HPSGSO RS34209

Fax (65) 2788990

**IN TAIWAN**

Hewlett-Packard Taiwan

8th Floor, Hewlett-Packard Building

337 Fu Hsing North Road

Taipei

(02) 712-0404

**IN ALL OTHER LOCATIONS**

Hewlett-Packard Inter-Americas

3495 Deer Creek Rd.

Palo Alto, California 94304

**HP**

TECHNICAL DATA SHEET SUPPLEMENT

PRINTED: JAN 1995 EDITION:

**HP PART NUMBER : 5951-5993**

